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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 23389 | 7590 | 07/11/2005 | EXAMINER NOVACEK, CHRISTY L | |
| SCULLY SCOTT MURPHY & PRESSER, PC 400 GARDEN CITY PLAZA SUITE 300 GARDEN CITY, NY 11530 | | | ART UNIT 2822 | PAPER NUMBER |

DATE MAILED: 07/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/665,997

Applicant(s)

DUCHESNE ET AL.

Examiner

Christy L. Novacek

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 April 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This office action is in response to the amendment filed April 25, 2005.

Response to Amendment

The limitations added to claims 1 and 11 are sufficient to overcome the Oda et al. (US 6,489,668) reference. Therefore, the rejections of claims 1-5 and 11-15 as being anticipated by Oda and the rejections of claims 6, 8-10, 16 and 18-20 as being unpatentable over Oda are hereby withdrawn.

The limitations added to claims 1 and 11 are sufficient to overcome the Barber et al. (US 6,590,292) reference. Therefore, the rejections of claims 1-5 and 11-15 as being anticipated by Barber and the rejections of claims 6, 7, 16 and 17 as being unpatentable over Barber are hereby withdrawn.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 3, 8-11, 13 and 18-20 are rejected under 35 U.S.C. 103(s) as being unpatentable over Katchmar (US 6,392,890) in view of the admitted prior art.

Regarding claim 1, Katchmar discloses providing an electronic component (14) having a first surface in electrical communication with a substrate (12), arranging a heat spreader (16) in a closely spaced relationship with an opposite surface of the semiconductor chip, and adhesive means bonding the heat spreader to the electrical component, wherein the adhesive means includes an electrically conductive silicone adhesive (42) positioned in a single spot on a center

surface portion of the electrical component and an electrically non-conductive silicone adhesive (36) of an extensively larger surface area than the single spot formed by the electrically conductive silicone adhesive extending about the electrically conductive silicone adhesive for concurrently bonding the heat spreader to the electronic component (Fig. 1a-2c; col. 2, ln. 53 – col. 6, ln. 49). Katchmar does not specifically disclose the electronic component to be a semiconductor chip. As recited in the admitted prior art (pg. 1-4 of the specification), a semiconductor chip attached to a printed circuit board and a heat spreader is well-known and conventional in the art. At the time of the invention, it would have been obvious to one of ordinary skill in the art that the “electronic component” of Katchmar includes a semiconductor chip because this method of forming an electronic component is well-known and conventional in the art.

Regarding claims 3 and 13, Katchmar discloses that the heat spreader is made of a heat-absorbing and dissipating material.

Regarding claims 8, 9, 18 and 19, Katchmar does not disclose a specific size of the single spot of electrically conductive adhesive; neither does Katchmar disclose a specific size of the electrically non-conductive adhesive. Instead, Katchmar (col. 4, ln. 52-58; col. 5, ln. 11-23) states, “The amounts of the electrical insulator material 36 and the good thermally conductive material 42 used in a particular situation depend upon surrounding circumstances including the nature of the materials 36, 42, the temperature, the volume of the gap 21 and the area of the surface of the component 14 (or DLA or overmold (not shown)) facing the gap 21.” At the time of the invention, it would have been obvious to one of ordinary skill in the art to use routine experimentation to determine optimal diameters of the adhesives of Katchmar, depending upon

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the nature of the material, the temperature, the volume of the gap between the electronic component and the heat spreader and the area of the surface of the electronic component because such variables of art recognized importance are subject to routine experimentation and discovery of an optimum value for such variables is obvious. See *In re Aller*, 105 USPQ 233 (CCPA 1955).

Regarding claims 10 and 20, Katchmar discloses spacing the heat spreader from the electronic component, but does not disclose a specific thickness of the space. Instead, Katchmar (col. 3, ln. 4-8) states, "The height of the gap 21 may depend upon the size of the components 14 and may vary from one component to another." At the time of the invention, it would have been obvious to one of ordinary skill in the art to use routine experimentation to determine the thickness of the spacing between the heat spreader and the electronic component of Katchmar, depending upon the size of the electronic component, the size of the heat spreader, and the amount of adhesive required to fix the heat spreader and the electronic component together because such variables of art recognized importance are subject to routine experimentation and discovery of an optimum value for such variables is obvious. See *In re Aller*, 105 USPQ 233 (CCPA 1955).

Regarding claim 11, Katchmar discloses providing an electronic component (14) having a first surface in electrical communication with a substrate (12), arranging a heat spreader (16) in a closely spaced relationship with an opposite surface of the semiconductor chip, and adhesive means bonding the heat spreader to the electrical component, wherein the adhesive means includes an electrically conductive silicone adhesive (42) positioned in a single spot on a center surface portion of the electrical component and an electrically non-conductive silicone adhesive

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(36) of an extensively larger surface area than the single spot formed by the electrically conductive silicone adhesive extending about the electrically conductive silicone adhesive for concurrently bonding the heat spreader to the electronic component (Fig. 1a-2c; col. 2, ln. 53 – col. 6, ln. 49). Katchmar does not specifically disclose the electronic component to be a semiconductor chip. As recited in the admitted prior art (pg. 1-4 of the specification), a semiconductor chip attached to a printed circuit board and a heat spreader is well-known and conventional in the art. At the time of the invention, it would have been obvious to one of ordinary skill in the art that the “electronic component” of Katchmar includes a semiconductor chip because this method of forming an electronic component is well-known and conventional in the art.

Claims 2, 4-7, 12 and 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Katchmar (US 6,392,890) in view of the admitted prior art as applied to claim 1 above, and further in view of Barber et al. (US 6,590,292, previously cited).

Regarding claims 2, 4, 6, 12, 14 and 16, Katchmar does not disclose from what kind of material the heat spreader is made. Like Katchmar, Barber discloses attaching an electrical component to a heat spreader using an electrically conductive adhesive. Barber teaches that the heat spreader may advantageously be made of copper and, thereby, the electrically conductive adhesive can electrically connect the heat spreader and the electrical component to ground the heat spreader, which provides the benefit of reducing electromagnetic interference effects (col. 5, ln. 43-45; col. 6, ln. 22-35). At the time of the invention, it would have been obvious to one of ordinary skill in the art to form the heat spreader of Katchmar of copper so that it may be electrically connected to the electronic component as taught by Barber because Barber teaches

that it is advantageous to electrically connect the heat spreader to the electronic chip in order to reduce electromagnetic interference effects.

Regarding claims 5 and 15, Katchmar does not disclose that the heat spreader includes a plate-shaped lid or cap member. Barber shows a plate-shaped heat spreader. At the time of the invention, it would have been obvious to one of ordinary skill in the art to form the heat spreader of Katchmar such that it is plate-shaped, as shown by Barber, because the a plate-shaped heat spreader forms a smaller and more structurally stable heat spreader than one with fins.

Regarding claims 7 and 17, Katchmar does not disclose that the electrically non-conductive adhesive is thermally conductive. The thermally conductive adhesive advantageously allows maximum heat transfer between the electronic component and the heat spreader. At the time of the invention, it would have been obvious to one of ordinary skill in the art to use a thermally conductive adhesive for Katchmar's electrically non-conductive adhesive as taught by Barber because the thermal conductivity of the adhesive would allow maximum heat transfer from the electronic component to the heat spreader.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christy L. Novacek whose telephone number is (571) 272-1839. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CLN
July 7, 2005


AMIR ZARABIAN
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